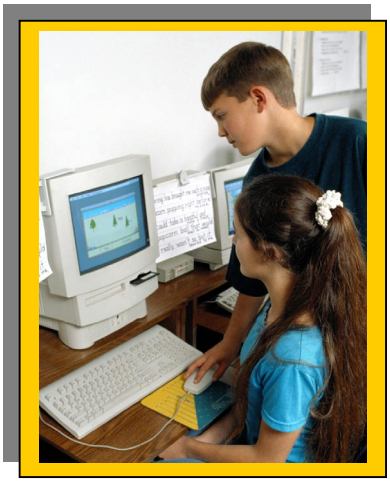
Science Modules

This module focuses on the relationship between basic chemistry concepts and the information that will be returned by the Genesis mission. If you are using Genesis science modules for the first time, read the User's Guide thoroughly before you begin. (*View User's Guide as PDF.)*

The following classroom materials are available in Portable Document Format (PDF) for your browsing and printing convenience. The files are print-optimized, and should be printed to achieve maximum resolution. **Adobe's new Acrobat Reader 4.0 is required** to view and/or print. To install the FREE reader, visit the Adobe Web site.

Take a look at additional science modules that are available on the Genesis Web site. All technical terms in the science modules are compiled in the Glossary for easy access.

Technology Applications are available for this module.



Cosmic Chemistry: Understanding Elements

Elements are explored from various perspectives in this science module. During the exploration, students group elements by their characteristics much like Dmitri Mendeleev did in the 19th century. Students will interact with others by finding out about elements in particular groups. Using several resources, students will learn how elements are currently being used in products found in everyday life. Genesis scientists want to learn about the building blocks of our solar system. The Elemental Mysteries for Genesis Scientists student text engage students in the questions these scientists are asking. Finally students create mathematical models to explain differences in chemical reactivity among elements. Using their model students will interpolate characteristics of a hypothetical element in the assessment activity.

- Module Planning Guide

The Periodic Table: Atoms, Elements, and Isotopes

- Teacher Text

PowerPoint Presentation (from *Cosmic Chemistry: An Elemental Question)*

PowerPoint as PDF

Briefing

The teacher text contains content information on atoms, elements, the periodic table, isotopes and the Genesis mission. Although written for the teacher, this text could be used in total or in part for students after they have completed the interactive simulation. The module planning guide contains information about the entire module. This grid has been set up to give teachers the tools necessary to teach the module at a glance.

Interactive Simulation

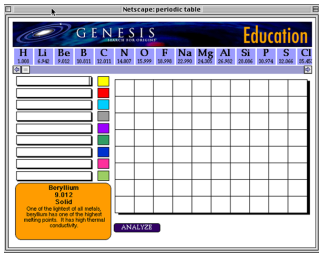
- Teacher Guide
- User Quick Clicks
- Student Activity

Making Sense of the Elements

- Teacher Guide
- Student Activity

Exploration

Students learn about the periodic table by patterning the same approach that Mendeleev used in the 19th century using an interactive simulation. The simulation may be completed using element cards without the computer with Making Sense of the Elements. The interactive simulation can also be run live off the Web site or downloaded to student computers with Interactive Simulation. The teacher guide for each of these contain complete lesson plans for each option.



Curriculum Connections
National Standards Addressed

Grades 5-8

Science as Inquiry
- Abilities necessary to do scientific inquiry
- Understandings about scientific inquiry

Physical Science
- Properties and changes of properties in matter
- Transfer of Energy

Science and Technology
- Abilities of Technological Design
- Understandings about Science and Technology

History and Nature of Science
- Science as a Human Endeavor
- Nature of Science
- History of Science

Student Mission

Students will work in groups to study elements in one family (group). Each student will research one element and learn how elements are currently being used in products found in everyday life.

Past, Present, and Future

- Teacher Guide

A Historic Overview: Mendeleev and the Periodic Table

- Teacher Guide Supplement
- Student Text
- Student Activity: Questions and Strategies

The Modern Periodic Table

- Teacher Guide Supplement
- Student Text
- Student Activity: Questions and Strategies

Elemental Mysteries for Genesis Scientists

- Student Text

Development

Student's complete reading exercises to learn more about the development of the periodic table, how it is used today and what Genesis scientists hope to contribute to our understanding of the elements.

Curriculum Connections
National Standards Addressed

Grades 9-12

Science as Inquiry
- Abilities necessary to do scientific inquiry
- Understandings about scientific inquiry

Physical Science
- Structure of atoms
- Structure and properties of matter

Science and Technology
- Abilities of Technological Design
- Understandings about Science and Technology

History and Nature of Science
- Science as a Human Endeavor
- Nature of Scientific Knowledge

Element Research

- Teacher Guide
- Student Activity

Interaction/Synthesis

Students will use the Internet and other sources to locate information about one element. They will then share the information about their element with their group (family) and with the class.

Connecting Models and Critical Questions

- Teacher Assessment Guide
- Student Assessment Activity

Assessment

From the *Cosmic Chemistry: An Elemental Question* module, students initially meet in lab groups to discuss information provided about a subset of the elements. They finish the assessment individually, creating a mathematical model to explain differences in chemical reactivity among these elements, analyzing the process of developing this model, interpolating from their model the characteristics of a hypothetical element, and planning a presentations to their peers on their model.

This education module, *Cosmic Chemistry: Understanding Elements*, was developed by educators at Mid-continent Research for Education and Learning.

McREL

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